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Preface

Jelle Kaastra · Frits Paerels

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High-resolution X-ray spectroscopy has become a powerful tool for astrophysics since the launch of Chandra and XMM-Newton in 1999. The grating spectrometers on both satellites still continue to provide excellent data, while imaging calorimeters are being prepared for future missions like Astro-H and IXO. The synergy with other wavelength bands like the UV was boosted recently by the addition of COS to HST. X-ray spectroscopy offers unique diagnostics to study almost any object in the Universe.

In order to commemorate the advances made during the last decade, to review the current state of high-resolution X-ray spectroscopy, and to look forward to future opportunities a conference was held where all these aspects were discussed. The meeting contained the latest results for a broad range of objects. The Scientific Organising Committee took care to plan the program according to physical processes, and not according to type of objects. There were sessions on present and future instrumentation, abundances in X-ray plasmas, atom-atom interactions as seen through X-rays, He-like triplet diagnostics, laboratory plasmas and models, X-ray spectroscopy and gravity fields, plasmas with finite optical depth, kinematics and shock diagnostics, and the UV-X-ray connection. The 140 participants to this meeting appreciated this approach very well, and it provided a much broader insight into several astrophysical phenomena than sessions focused on classes of objects.

The three-day conference took place in Utrecht, The Netherlands. Utrecht has a long tradition in spectroscopy, starting with Willem Julius, a pioneer on Solar spectroscopy and Leonard Ornstein, who made great contributions to quantitative spectroscopy, also being

J. Kaastra (✉)
SRON Netherlands Institute for Space Research, Sorbonnelaan 2, 3584 CA Utrecht, Netherlands
e-mail: J.Kaastra@sron.nl

J. Kaastra
Sterrenkundig Instituut, P.O. Box 80000, 3508 TA Utrecht, Netherlands

F. Paerels
Dept. of Astronomy and Columbia Astrophysics Laboratory, Columbia University, 550 W 120th St, New York, NY 10027, USA

the PhD supervisor of 94 students. The spectroscopic tradition was continued by Marcel Minnaert, a PhD student of Julius. A student of Minnaert, Cees de Jager, founded in 1961 the Laboratory for Space Research, the predecessor of SRON. One of the main lines of research of SRON is X-ray spectroscopy. SRON made important contributions to high resolution spectroscopy; it was PI of grating spectrometers on EXOSAT, Einstein, Chandra and XMM-Newton. Also one of the most widely used spectroscopic codes was developed at SRON by Rolf Mewe and colleagues. Currently SRON is involved in the development of high spectral resolution imaging X-ray detectors.

Apart from poster presentations, contributed and solicited talks the conference also had a large number of invited review talks. The reviewers paid specific attention to present their work to a general audience of astrophysicists with interest in spectroscopy, instead of to an audience of experts. As a result, the invited reviews were appreciated well, and can serve as a good starting point for further reading. In this volume we present the major part of these invited review papers.

Interestingly, almost 40 years before a conference with a similar focus was held at the same location, and the results of that meeting have been published in Space Science Reviews, volume 13 (Ultraviolet and X-ray Spectroscopy of Astrophysical and Laboratory Plasmas, Utrecht, Netherlands, August 24–26, 1971, Editor A.H. Gabriel). A comparison of the present volume with that volume shows the impressive progress that has been made over the last four decades.

The scientific organizing committee consisted of Jelle Kaastra (SRON & Utrecht University, Netherlands, Chair), Elisa Costantini (SRON, Netherlands, Co-chair), Ehud Behar (Technion, Israel), Graziella Branduardi-Raymont (University College London/Mullard Space Sciences Laboratory, UK), Claude Canizares (Massachussets Institute of Technology, USA), Manuel Güdel (Eidgenössische Technische Hochschule Zürich, Switzerland), Hideyo Kunieda (Nagoya University, Japan), Takaya Ohashi (Tokyo Metropolitan University, Japan), Frits Paerels (Columbia University, USA), Norbert Schartel (European Space Agency, Spain), Mike Shull (University of Colorado, USA), Randall Smith (Center for Astrophysics, USA), Harvey Tananbaum (Chandra X-ray Center, USA), and Frank Verbunt (Utrecht University, Netherlands).

We would like to express our thanks to the SOC but also to the members of the Local Organising Committee, (Hans Bloemen, Esther Gravestijn, Jelle de Plaa, Klara Schure, Jean in ‘t Zand) for their invaluable help in organizing this conference.

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